



Sssh! We're talking about the Quiet Eye – comment on Vickers

Joseph Baker^{1,*} & Nick Wattie²

1 School of Kinesiology and Health Science, York University, Toronto, Canada

2 Faculty of Health Sciences, University of Ontario Institute of Technology, Oshawa, Canada

* Corresponding author: School of Kinesiology and Health Science, York University, 4100 Keele St., Toronto, ON, M3J1P3, Canada,
Tel: +1 416 7362100, Fax: +1 416 7365774,
Email: bakerj@yorku.ca

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Over the past two decades, the Quiet Eye (QE) has emerged as a consistent characteristic of expert perception in sport and other skilled domains (e.g., surgery). As noted in Vickers' (2016) target article, the QE reflects the stability of a performer's gaze in the period immediately before movement in an aiming task. The value of QE for differentiating both among performers of different skill levels and between successful executions and failures seems clear, as reported by several reviews (e.g., Rienhoff, Tirp, Strauss, Baker, & Schorer, 2016; Vickers, 2007; Vine, Moore, & Wilson, 2014). In fact, in their meta-analysis, Mann, Williams, Ward, and Janelle (2007) highlighted the QE as one of the most consistent perceptual-cognitive effects in sport expertise research.

After 20 years of study into this phenomenon (largely lead by Vickers and her colleagues), we believe the QE concept is at a

ABSTRACT

Over the past two decades, the Quiet Eye (QE) has emerged as a consistent characteristic of expert perception in sport and other skilled domains. The value of QE for differentiating both among performers of different skill levels and between successful executions and failures seems clear; however, we argue that research on QE is at a cross-roads and that future research should consider greater movement into five areas: replication, explanation, extension, integration and application. Greater attention to these areas may help to ensure that the full potential of QE is realized in sport and beyond.

Keywords:

perception – cognition – sport – Quiet Eye – expertise

crossroads. On the one hand, research in this field has clearly established the relevance of QE in the domain of sport and it could certainly become a dominant concept in athlete training and development. On the other hand, however, the QE almost undoubtedly applies to other areas of human performance. How does research move forward over the next 20 years to further legitimize this concept and expand its relevance in sport and beyond? In order to capitalize on the potential of QE for informing our understanding of aspects of skilled perception and for developing practical strategies to improve perceptual performance in sport and elsewhere, we argue for specific movement in five areas: replication, explanation, extension, integration and application.

Replication

Replication, although seemingly unattractive to journal editors who wish to focus on publishing new and novel findings, is a cornerstone of scientific inquiry. Over the history of QE research, very few studies have been 'straight up' replications of results. Importantly, while the QE effect appears robust in reviews and meta-analyses, there have been inconsistencies in results between studies and research labs (c.f., Glöckner, Heinen, Johnson, & Raab, 2012; de Oliveira, Oudejans, & Beek, 2006, 2008). These inconsistencies highlight the need for continual replication of previous work by different teams of researchers and with different tasks, sports and skill levels. Lack of replication can limit our understanding of the depth and breadth of this effect and can be a significant limitation for conducting and accurately interpreting meta-analyses.

Explanation

As noted above, there are several proposed explanations of the QE. In order to move into a more advanced level of understanding and application, researchers of this phenomenon need to determine the precise mechanism(s) driving this effect. Various ones have been proposed, ranging from a) QE facilitating a general quiescence of the psychomotor system, b) QE allowing greater time for response programming and c) QE allowing superior attentional control through inhibiting environmental distractors (see Rienhoff et al., 2016). It will also be important to determine (if possible) the optimal QE duration for different tasks (see Rienhoff et al., 2016). It is conceivable that QE may not have an optimal duration for a task; the optimal duration may in fact depend on specific task constraints. Optimal QE duration could vary, for example, across variations of the same task. When shooting a basketball, optimal duration may depend on task constraints like type and structure of the defense, speed of play, and distance to the basket. Similar to movement execution outcomes, there may be a variety of gaze solutions that depend on interactions between the performer and task. Studying this possibility would provide valuable insights into intra- and inter-individual variability in QE.

Extension

To date, most work on the QE has focused on stable, closed-ended aiming tasks (e.g., basketball free throw shooting, darts, etc.). However, the relevance of this stable gaze strategy for open-ended tasks is only beginning to be explored (e.g., Panchuk & Vickers, 2006). While the application of this effect to athlete development and performance is clear, extending the effect to other areas of human health and performance may prove fruitful. While research has explored the implications of QE in populations with developmental coordination disorder (DCD; Miles, Wood, Vine, Vickers, & Wilson, 2015), the potential

to extend research to other populations is promising. For instance, there has been some research considering gaze behavior of individuals with autism spectrum disorder (ASD, a core characteristic of which is lack of eye contact), however, research has neither considered specific perceptual skills (i.e., QE) nor how play and movement can be used to improve eye contact in social situations. The usefulness of QE training for children with DCD (Miles et al., 2015) suggests that QE research and interventions have tremendous potential for improving fundamental movement skills for other populations with developmental disorders. Moreover, the utility of the QE concept toward understanding and improving seemingly mundane, yet vital activities of daily living for quality of life, remains largely unrealized.

Integration

As our understanding of perceptual-cognitive expertise advances, it seems clear that perceptual-cognitive phenomena do not operate in isolation. In an effort to determine how QE integrates with other elements of perception, cognition and learning, researchers have begun exploring how QE relates to other concepts, such as focus of attention (Rienhoff, Fischer, Strauss, Baker, & Schorer, 2015), fields of vision (Rienhoff, Fischer, Strauss, Schorer, & Baker, 2012), and transfer of learning (Rienhoff et al., 2013). More work of this nature could be quite revealing regarding how the QE might be best utilized. For example, how does the structure of practice influence QE? Does blocked practice hinder the development of QE and does high contextual interference practice promote its development? Can QE be facilitated with an implicit learning approach and if so, which one (implicit or explicit) is superior for learning and performance? Answers to these questions would help situate QE amongst other well-supported motor behavior concepts.

Application

In our opinion, this is the area with the potential for the largest 'real world impact'. In our work with high performance sport teams, one of the most beneficial elements of the QE phenomenon is how easily it can be applied in practical situations. Unlike some motor learning concepts, the QE is quickly understood by coaches, trainers and athletes, and can rapidly be put into action in sports with stable, closed aiming tasks. That said, our understanding of how QE develops across an athlete's participation in sport is largely unknown, outside of short-term intervention studies (e.g., Moore, Vine, Cooke, Ring, & Wilson, 2012; Vine, Moore, & Wilson, 2011). How and when is the QE acquired across athlete development? Are there particular windows of development that are best suited for QE training? Is QE more likely to develop in a highly specific (i.e., specialized) environment or is it better facilitated through more variable, diversified environments? As with many aspects of skilled perception, understanding the time-course of development would allow for

more appropriate interventions to promote more rapid acquisition of this skill at the correct point of development.

Conclusion

Vickers' (2016) target article will assist with the continued expansion of the QE concept. Greater attention to the issues above may help to ensure that its full potential is realized in sport and beyond.

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Data Availability Statement

All relevant data are within the paper.

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